DEPARTMENT OF STATE
FEB 25 1927
DIVISION OF FOREIGN
SERVICE ADMINISTRATION

INDEX BUREAU
FEB
DEPT OF STATE

867R.6222

238751

2 Copies hereof to be sent to Comm Agri

Copy also to

and

DEPARTMENT OF STATE
MAR 3 1927
ASSISTANT SECRETARY OF STATE

A MAR 2 1927

Report No.11, Voluntary.

From Vice Consul David Williamson.

David Williamson.

Approved by
Consul General in Charge. Lewis W. Haskell.

Lewis W. Haskell.

Algiers, Algeria, February 9, 1927.

Date of Mailing, February 11, 1927.

FEB 25 1927

* * *

THE DECIMATION OF SHEEP FLOCKS IN SOUTHERN ALGERIA.

Reports from various sources have been received that the sheep in the Southern Territories of Algeria have been drastically reduced in numbers by the recent cold spell.

No official figures are yet available. A local newspaper gives the mortality as follows:

Lambs

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MAR 15 19
INDEX BUREAU

867R.6222/1

Lambs: 100 %

Ewes : 60 %

Sheep: 40 %

This represents a loss of 700,000 or 800,000 heads. An official in the Governmantal bureau of animal industry states that in his opinion, these figures are exaggerated, and estimates the mortality thus:

Lambs: 80 %

Ewes : 40 %

Sheep: 25 %

This would place the total loss at somewhere between 400,000 and 450,000 head . Other estimates fall between these limits.

According to the last official animal census in 1925, the total number of sheep in Algeria was 8,601,480, of which 3,996,583 were in the Southern Territories. The lowest estimated figure of the present loss, therefore is 10% of the total, and the highest is 20%. A short history of the conditions that have made this disaster possible follows.

The sheep industry in 1926 was a good one for the native sheep raisers in the Southern Territories. Early and plentiful rains in September and October, 1925, had allowed the sheep to be fattened earlier than usual, and this circumstance gave rise to an occurence unique in

Algerian

Algerian history: exportation to Marseilles began in January, 1926, and continued almost without interuption until October. In normal times, this exportation commences at the end of April.

The high prices prevailing in France were vastly remunerative to the sheep raisers in the South. In June, 1926, mistrusting the future of the franc, they converted their cash into sheep, principally buying ewes at high prices, with a view to increasing their flocks. The ewes were fat and could have been exported; they were, however, kept for breeding purposes.

Lambing began early and in excellent conditions, about ninety per cent. of the ewes being fruitful in comparison to the normal average of seventy-five per cent.

The Summer and Autumn of 1926, however, were very dry. Water and pasturage were lacking, resulting the stoppage of the ewes' milk and the death of a large number of lambs from under feeding. The ewes, already weakened, died in great numbers from the prolonged and extreme cold. It may be added that no shelter is provided by thenomad shepherd for his flocks.

The situation in Northern Algeria is not much better. Heavy mortality is reported from important centres such as Sétif, Batna, Aumale and Médéa; no attempt has been made, however, to estimate the numbers or the percentages killed. A heavy fall of snow over practically all Northern Algeria, exclusive of the littoral, accounts for the unusually high mortality in the high plateaux region.

The result

The result of this disaster is reflected in the prices of sheep products. Sheep are selling at Marseilles for twelve francs the kilogram; at Algiers, for seventeen and eighteen francs. Mutton and lamb are bound to go higher. Sheep skins, on the contrary, which were worth 1,600 francs a hundred kilograms last year, are selling for 750 to 800 francs at present.

A strinking occurence shows the effect of this mortality: on January 20, 1927, three hundred French sheep were sold in Algeria,— a country which exports normally more than a million sheep a year.

* * * *

In Quintuplicate:

862.2
DW:YM.

EMBASSY OF THE
UNITED STATES OF AMERICA

Paris, July 13, 1927.

No. 7670

DEPARTMENT OF STATE
JUL 30 1927
DIVISION OF FOREIGN
SERVICE ADMINISTRATION

DEPARTMENT OF STATE
JUL 28 1927
DIVISION OF
WESTERN EUROPEAN AFFAIRS

For Distribution

To agr Ct
Aug'
August 5, 1927

INDEX BUREAU
FILED
AUG 5 1927

The Honorable

The Secretary of State,

Washington.

Sir:

I have the honor to enclose herewith a copy and translation of a letter dated July 7, 1927, from Doctor Serge Voronoff, of the College of France, in which he states that the British Government has expressed the desire, which has been granted, to send a mission to Algeria to ascertain the results of engraftment on sheep belonging to the General Government of Algeria, and asks the United States Government also to send a mission, in October next, for this purpose. Doctor Voronoff states that the results in question are of great importance, as they clearly demonstrate the interest all countries have in applying his method to increase the weight of sheep and their

yield

yield of wool, and adds that he would personally feel a great moral satisfaction at seeing the United States profit by this new factor in economic wealth.

I respectfully request to be informed as to what action the Department deems it advisable to take in regard to this matter.

I have the honor to be, Sir,

Your obedient servant,

Sheldon Whitehouse

Sheldon Whitehouse,

Chargé d'Affaires ad interim.

Enclosures:

1. Copy of letter from Doctor Voronoff dated July 7, 1927.

2. Translation of No. 1.

In quintuplicate.

Enclosure No. 1 to Despatch No. 7670

Copie.

COLLEGE DE FRANCE

Laboratoire de Chirurgie Expérimentale

Paris, le 7 Juillet 1927.

Son Excellence Monsieur Myron T. Herrick,
Ambassadeur des Etats Unis d'Amérique,
2, Avenue d'Iéna,
PARIS.

Monsieur l'Ambassadeur:

J'ai l'honneur de porter à votre connaissance que le Gouvernement Anglais a exprimé le désir, qui a été naturellement agréé, d'envoyer une mission en Algérie afin de constater les résultats de greffes sur les troupeaux des moutons du Gouvernement Général d'Algérie. Ces résultats sont d'une grande importance, car ils apportent une démonstration nette de l'intérêt pour tous les pays d'appliquer ma méthode pour augmenter le poids des moutons et leur rendement en laine. Je ressentirais personnellement une grande satisfaction morale de voir votre pays profiter de ce nouveau facteur de richesse économique. Je me permets donc par votre haut intermédiaire de prier votre Gouvernement d'envoyer également une mission qui devra se trouver le 20 Octobre prochain à Alger, où rendez-vous est donné à toutes les missions au Service d'Elevage du Gouvernement, 26, Boulevard Baudin, Alger.

Je peux assurer d'avance à votre mission le meilleur accueil du Gouvernement Général d'Algérie et de mon côté, je ferai tout mon possible pour lui faciliter la tâche.

Veuillez agréer, Monsieur l'Ambassadeur, l'assurance de ma haute considération.

Signé : S. VORONOFF.

Enclosure No. 2 to Despatch No. 7670

Translation.

COLLEGE OF FRANCE

Laboratory of Experimental Surgery

Paris, July 7, 1927.

His Excellency Mr. Myron T. Herrick,
Ambassador of the United States of America,
2, Avenue d'Iéna,
PARIS.

Mr. Ambassador:

I have the honor to inform you that the British Government has expressed the desire, which has naturally been granted, to send a mission to Algeria for the purpose of ascertaining the results of engraftment on the flocks of sheep of the General Government of Algeria. These results are of great importance, as they clearly demonstrate the interest all countries have in applying my method to increase the weight of sheep and their yield of wool. I would personally feel a great moral satisfaction at seeing your country profit by this new factor in economic wealth. I venture, therefore, through your distinguished intermediary, to beg your Government also to send a mission which should be at Algiers on October 20th next, where all the missions are asked to meet at the Breeding Department of the Government, 26, Boulevard Baudin, Algiers.

I can assure to your mission in advance the heartiest reception on the part of the General Government of Algeria, and for my part I will do everything I can to aid it in this matter.

Please accept, Mr. Ambassador, the assurance of my high consideration.

(Signed) S. VORONOFF.

In reply refer to
WE 851.R.62222/1

August 5,1927

The Secretary of State presents his compliments to the Honorable the Secretary of Agriculture and has the honor to enclose for his consideration and an indication of the reply to be made a copy of a despatch from the American Embassy at Paris, forwarding a copy and translation of a letter from Doctor Serge Voronoff of the College of France, suggesting that the Government of the United States send a mission to Algeria to ascertain the results of engraftment on sheep belonging to the General Government of Algeria.

Enclosures:
From France No. 7670,
July 13, 1927, with
enclosure.

FA:ET/KEB:SS WE CR
f
Aug. 4, 1927.

A true copy of the signed original.

H.C.H.

F.W. 851.R.62222/1

EMBASSY OF THE
UNITED STATES OF AMERICA

Paris, August 22, 1927.

No. 1791

The Honorable

The Secretary of State,

Washington.

Sir:

With reference to my despatch No. 7670 of July 13th last, transmitting a copy of a letter from Doctor Serge Voronoff regarding his desire that the American Government should send a mission to Algeria to observe the results of grafting experiments on sheep belonging to the Government of Algeria, I have the honor to report that I am in receipt of a further communication from Doctor Voronoff in which he states that, at the request of the British Government, the delegations will meet at Algiers November 4th instead of October 20th.

I have the honor to be, Sir,

Your obedient servant,

Sheldon Whitehouse

Sheldon Whitehouse,

Chargé d'Affaires ad interim.

In quintuplicate.

In reply refer to
WE 851 R. 62222/2

September 19, 1927

The Secretary of State presents his compliments to the Honorable the Secretary of Agriculture, and referring to the letter from the Secretary of State dated August 5, 1927, in regard to the suggestion made by Doctor Serge Voronoff that the Government of the United States send a mission to Algeria to observe the results of grafting experiments on sheep belonging to the Algerian Government, has now the honor to enclose a copy of a further despatch on the subject from the American Embassy at Paris to the effect that Doctor Voronoff states that the delegations will meet at Algiers on November 4, next, instead of October 20.

Enclosure:
From France, No. 7794,
August 22, 1927.

CR
Sept. 17, 1927.

JHCH

FA:ET:HME:SS WE

A true copy of the signed original.

851.6222/2

DEPT. OF STATE
SEP 27 1927
Division of ... Administration

RECD
INDEX BUREAU
DEPT. OF STATE

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DEPARTMENT OF AGRICULTURE

WASHINGTON

DEPT. OF STATE
SEP 23 1927
Division of

SEP 24 27

September 23, 1927

To Mr. Mallet
Sept 26

DEPARTMENT OF STATE
File 800.1 WHF
SEP 24 1927
DIVISION OF
WESTERN EUROPEAN AFFAIRS

INDEX BUREAU
SEP 26 1927
RECD

October 11 1927

The Honorable,

The Secretary of State.

Dear Mr. Secretary:

I have your communication of September 19 (WE 851 R. 62222/2) and the enclosed copy of a letter from Mr. Sheldon Whitehouse, Charge d'Affaires ad interim, Paris, advising that the delegations interested in the grafting experiments on sheep belonging to the Government of Algeria, will meet at Algiers November 4th instead of October 20th.

Sincerely yours,

C. W. Mallet

Acting Secretary.

861.62222/2

October 11, 1927.

2464

To the American Chargé d'Affaires ad interim,

Paris, France.

The Secretary of State acknowledges the receipt of despatch No. 7839 of September 14, 1927, from the Chargé d'Affaires ad interim in which, with reference to previous correspondence concerning the invitation extended through Doctor Serge Voronoff of the College of France to the United States to send a mission to Algeria to inspect his gland grafting experiments with sheep being conducted at the Algerian breeding station, the Chargé d'Affaires ad interim states that the meeting has been postponed from October 20th until November 4th, next.

A copy of the despatch from the Chargé d'Affaires was transmitted to the Secretary of Agriculture and a copy of the reply made by his Department is now enclosed, from which it appears that that Department does not wish to add anything to the statements made in its letter of August 16, last.

The Secretary of State, therefore, instructs the Chargé d'Affaires to advise Doctor Voronoff in the sense of instruction No. 2401 of August 24, and the letter from the Department of Agriculture of August 16,

a copy

a copy of which was enclosed therewith.

The Secretary of State adds for the information of the Chargé d'Affaires that an informal inquiry of the Department of Agriculture elicited the reply that it is not probable that that Department will be able to be represented at the meeting mentioned.

Enclosure:
From Department of Agriculture,
September 23, 1927.

851.R.62222/2.

CR
Oct. 10, 1927.

FA:FMM:HME:SS

A true copy of the signed original.

ARTMENT OF STATE
MAR 30 1927
DIVISION OF FOREIGN
SERVICE ADMINISTRATION

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APR 5 1927
DIVISION OF FOREIGN
SERVICE ADMINISTRATION

INDEXED BUREAU
MAR 30 27
DEPT OF STATE

Instrs. to Consulate General, Paris drafted April 2, 1927. P.G.

DEPARTMENT OF AGRICULTURE
WASHINGTON, APR 15 1927.

Ackd: by letter dated April 6, 1927. P.G.D.

April 8, 1927. March 29, 1927

811.0222/3
FILED
APR 8 1927

The Honorable,

The Secretary of State.

Dear Mr. Secretary:

Sheep husbandry investigators of this Department have noted the following newspaper item on the first page of the March 23,1927, issue of the Daily News Record of New York City:

"Gland Grafting in Sheep to be Investigated by
British Government.
By wireless from London Bureau of Daily
News Record.
Copyright, 1927, Fairchild News Service.

"London. March 22. - Gland-grafting experiments on sheep at the French Government's Algeria station will be observed officially by Great Britain, according to an announcement from the British Minister of Agriculture.

"The announcement says the Minister of Agriculture has decided to send a commission composed of scientific men to Algeria next autumn to examine into Dr. Voronoff's attempts. The commission may include, it was stated, professors in breeding research from leading British universities."

The Department of Agriculture would greatly appreciate your assistance in securing through the American Embassy at Paris, all the scientific information available with regard to the gland-grafting experiments mentioned as having been conducted by Dr. Voronoff. The effects of gland grafting on the growth of wool and on the sheep's body are of special interest to scientific workers in this Department.

Sincerely yours,

R. W. Dunlap
Acting Secretary.

April 8, 1927.

In reply refer to
FA ~~102.7/1270~~

The Honorable

The Secretary of Agriculture.

Sir:

I have the honor to advise you that, in compliance with the request contained in a letter dated March 29, 1927, from the Acting Secretary of Agriculture, the American Consul General at Paris, France, has been instructed to endeavor to obtain, for the sheep husbandry inspectors of the Department of Agriculture, all scientific information available with regard to certain gland grafting experiments conducted by Doctor Voronoff at the French Government's station in Algeria.

I have the honor to be, Sir,

Your obedient servant,

For the Secretary of State:

Wilbur J. Carr
Assistant Secretary.

FA: PGD: BBS
P.G.D.
ACH.
1400

Ch
April 7, 1927.

A true copy of the signed original.

FW 851.6 Z22/3

April 5, 1927.

Alphonse Gaulin, Esquire,

American Consul General,

Paris, France.

Sir:

The Department is in receipt of a letter dated March 29, 1927, from the Acting Secretary of Agriculture, stating that the sheep husbandry investigators of the Department of Agriculture have noted the following newspaper item on the first page of the DAILY NEWS RECORD of New York City for March 23, 1927:

"Gland Grafting in Sheep to be Investigated by British Government.
By wireless from London Bureau of
Daily News Record.
Copyright, 1927, Fairchild News
Service.

"London. March 22- Gland-grafting experiments on sheep at the French Government's Algeria station will be observed officially by Great Britain, according to an announcement from the British Minister of Agriculture.

"The announcement says the Minister of Agriculture has decided to send a commission composed of scientific men to Algeria next autumn to examine into Dr. Voronoff's attempts. The commission may include, it was stated, professors in breeding research from leading British universi ties."

The effects of gland grafting on the growth of wool and on the sheep's body are of special interest to the scientific workers of the Department of Agriculture, and that Department would greatly appreciate your assistance in obtaining for it all the scientific information available with regard to the gland grafting experiments

mentioned

mentioned as having been conducted by Doctor Voronoff.

It is desired that you endeavor to obtain and forward to the Department for transmission to the Department of Agriculture, the desired information.

I am, Sir,

Your obedient servant,

For the Secretary of State:

WILBUR J. CARR

~~102.7/1970~~

FA:PGD:BBS
P.S.D

CR

APR 4 1928

N° 64

AMERICAN CONSULATE GENERAL

Paris, France. April 25, 1927.

DEPARTMENT OF STATE
MAY 5 1927
DIVISION OF FOREIGN SERVICE ADMINISTRATION

2 Copies to Agriculture (&a)
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SUBJECT : Gland Grafting Experiments in Algeria by Doctor Serge Voronoff.

DEPARTMENT OF STATE
APR 29 1927

The Honorable

The Secretary of State,

Washington.

Sir :

I have the honor to acknowledge the receipt of the Department's instruction of April 5, 1927, File N° ~~102.7/1270~~, with reference to the gland grafting experiments of Doctor Serge Voronoff on sheep in Algeria and instructing me to obtain and forward to the Department for transmission to the Department of Agriculture all the scientific data available upon this subject.

MAY 9 1927

There is enclosed herewith a report based upon such general information as could be obtained in Paris, and it is hoped that more detailed and scientific data may shortly be received through the Office du Gouvernement Général de l'Algérie, 10 Rue des Pyramides, Paris, the Director of which has agreed to write to M. Trouette, Chef du Service de l'Elevage du Gouvernement Général de l'Algérie at Algiers.

It may be

It may be stated in brief that while very interesting results of gland grafting are said to have already been achieved, they should be closely observed nevertheless for a period of several years covering at least three generations, before it can be finally determined whether or not the beneficial effects of the operations will be lasting in nature.

Supplemental information will be forwarded to the Department as soon as received from the Gouvernement Général at Algiers.

I have the honor to be, Sir,

Your obedient servant,

A. Gaulin.
American Consul General.

Enclosure: Report.

File : N° 102.7
RD./G.

GLAND GRAFTING EXPERIMENTS UPON SHEEP

AS PRACTISED IN ALGERIA BY DOCTOR SERGE VORONOFF

(In compliance with Department's Instruction of April 5, 1927, File N° 102.7/1270.)

From Consul

Raymond Davis.

Raymond Davis.

Paris, France. Date of Preparation : April 25, 1927.

Date of Mailing : April 26, 1927.

Approved :

A. Gaulin
American Consul General

Doctor Serge Voronoff, already well known to the public and in scientific circles on account of his gland grafting operations with a view to the renewal of youth, has for several years been experimenting with the same process upon domestic animals, particularly bulls and rams, in an endeavor to prolong the life and usefulness of valuable but superannuated breeders, to secure a more rapid development of young animals and

to create

to create a superior stock by the transmission to future generations of qualities and characteristics obtained by the use of breeders, revitalized by the animal gland graft.

These experiments, made by Doctor Voronoff and his pupils on several hundreds of animals in France, Algeria, Tunis, Morocco, Sudan, Senegal and Italy, are of great practical importance to the question of stock breeding, and the results already obtained, while perhaps not yet conclusive in character, are, to say the least, interesting and worthy of consideration.

With respect to males, castrated and then grafted, there is noticed a return of secondary sexual characteristics, together with an increase in vigor, and leanness, greater activity and a resumption of the capacity for service. Results corresponding to these have been obtained with respect to females ; reappearance of characteristics lost or diminished, and in particular, an increase in the yield of milk.

Practically, the use of the graft is of value on aged, senile animals, ex-breeders, incapable of further service. Once grafted, these animals regain their strength and their reproductive capacities. Certain signs of rejuvenescence become apparent, such as brightness of the hair on bulls and the growth of wool on rams. All the animals operated upon by Doctor Voronoff have had vigorous offspring and have had several years added to their lives.

Grafting the young animal makes him more vigorous, more muscled and more virile than an ungrafted animal of the

same litter. With respect to sheep grafted very young, a heavier production of wool has been obtained and an increase in bodily development which manifests itself by greater weight and an earlier production of meat.

For example a characteristic experiment was made upon three rams aged, three, four and five months, respectively, weighing 18, 23 and 30 kilograms. The smallest which only weighed 18 kilograms received the graft from the large lamb weighing 30 kilograms while the second, of 23 kilograms was left intact. Ten months later, the third had only gained 4.2 kilograms, the second and untouched animal, 13 kilograms, and the first which had been grafted, had gained 18 kilograms.

The Doctor has sought to preserve the characteristics obtained by the gland graft on certain subjects and by a series of experiments, to transmit to the offspring of remarkable animals, the advantages of vitality and size, greater milk yield with respect to cows and longer heavier wool with respect to sheep.

He commenced a trial two years ago on a flock of sheep belonging to the Algerian government ; males, revitalised by the graft, were alone used for purposes of reproduction. While it is still too early to determine whether or not the results of the work are to be lasting, M.G. Trouette, Inspecteur du Service de l'Elevage de l'Algérie, has just published in the Eleveur Nord-Africain, report based upon an observation of the effect upon two generations of sheep, which were treated according to the process of Doctor Voronoff at the Tadmit station.

His report is as follows :

" The young animals grafted in 1924, are to-day clearly superior, both with respect to weight and to wool, to the others in the same flock which were not operated upon. The two year old rams, ungrafted, weigh on an average, 61.3 kilograms, while the grafted of the same age have attained an average of 68.5; this is about one tenth increase in weight due to the graft.

The wool of the ungrafted animals has weighed on an average 3.1 kilograms ; the grafted animals have given on an average 3.7 kilograms, or an increase of about one sixth.

Furthermore, the lambs of the young grafted rams are much stronger than those born in the same flock from ordinary rams of the same age. At five months, the first attained the average weight of 38 kilos and gave 0.980 kilograms of wool, while the second weighed only 30,100 with wool weighing only 0.680 kilograms.

This fact, says Doctor Voronoff, derived from experiments on a flock of 3000 sheep, gives us more then the simple hope, of seeing new qualities acquired and definitely fixed after two or three successive grafts, and transmitted thereafter without need of further operations. What must be borne in mind is that the animal graft which I have realised, makes it possible, just as does the vegetable graft, to force nature and to give us finer and more perfect specimens possessing superior qualities.

A new series of grafts is now being made on lambs which are the progeny of grafted animals, under the direction of M. le Vétérinaire Bosselut and M. le Vétérinaire Rampon".

Source of Information : Office du Gouvernement Général de l'Algérie.

RD./G.
File N° 102.7

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INDEX BUREAU
DEPT. OF STATE
DEPARTMENT OF STATE
AUG 18 1927
DIVISION OF FOR
SERVICE ADMINIS
AUG 17 27

DEPARTMENT OF AGRICULTURE
WASHINGTON

August 16, 1927

The Honorable,

The Secretary of State.

Dear Mr. Secretary:

Receipt is acknowledged of your communication of August 5, with which you enclose documents from France designated as No. 7670, dated July 13, 1927, which convey an invitation from Dr. Voronoff, to send a commission from the United States to inspect his gland grafting experiments with sheep that are being conducted at the breeding department of the French Government at Algiers.

This invitation is highly appreciated. At present it does not appear possible for sheep specialists of the Department of Agriculture to arrange their itineraries so as to be at Algeria on October 20, the date suggested by Dr. Voronoff. If it is possible at any time to arrange for representatives of this Department to visit the breeding department at Algiers this matter will be brought to your attention for this Department is very much interested in the gland grafting experiments being conducted by Dr. Voronoff.

Sincerely yours,

C. W. Marvin

Acting Secretary.

851.6222/1
INDEX BUREAU
FILED
AUG 26 1927

AUGUST 24, 1927.

2401

To the American Chargé d'Affaires ad interim,

Paris.

The Secretary of State acknowledges the receipt of the despatch of the Chargé d'Affaires ad interim No. 7670 of July 13, 1927, enclosing a copy of a translation of a letter from Doctor Serge Voronoff of the College of France, conveying an invitation to send a mission from the United States to Algeria, to inspect his gland grafting experiments with sheep that are being conducted at the breeding department of the French Government at Algiers.

Copies of the despatch and its enclosures, were transmitted to the Secretary of Agriculture and the Department is now in receipt of a reply, a copy of which is enclosed.

The Secretary of State instructs the Chargé d'Affaires ad interim to advise Dr. Voronoff in the sense of the enclosed letter.

Enclosure:
From Agriculture,
August 26, 1927.

103.7/1338

FA: FM/MRR SS:

811.42222/37

RECD
INDEX BUREAU
SEP 23 27
DEPT. OF STATE

EMBASSY OF THE
UNITED STATES OF AMERICA

Paris, September 14, 1927.

No. 7839

DEPARTMENT OF STATE
SEP 24 1927
DIVISION OF FOREIGN
SERVICE ADMINISTRATION

DEPT. OF STATE
SEP 23 1927
Division of
Foreign Service Administration

FILED
INDEX BUREAU
SEP 27 1927

noted Sept 27 — see letter of agriculture of Sept 22

The Honorable

The Secretary of State,

Washington.

Sir:

I have the honor to acknowledge the receipt of the Department's Instruction No. 2401 of August 24, 1927, directing that to the invitation of Doctor Serge Voronoff of the College of France to send a mission from the United States to Algeria to inspect his gland grafting experiments with sheep the Embassy should reply to the effect that it does not appear possible for the specialists of the Department of Agriculture to arrange their itineraries so as to be in Algiers on October 20th, the date suggested by Dr. Voronoff.

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OCT 12 1927

In view of Dr. Voronoff's later announcement, however, conveyed to the Department in Embassy Despatch No. 7797 of August 22, 1927, that

that the date for the meeting had been postponed until November 4th, I shall refrain from replying to Dr. Voronoff until again instructed by the Department.

I have the honor to be, Sir,

Your obedient servant,

Sheldon Whitehouse

Sheldon Whitehouse,
Chargé d'Affaires ad interim.

In triplicate.

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INDEX BUREAU
OCT 27 27
DEPT. OF STATE

EMBASSY OF THE
UNITED STATES OF AMERICA

No. 7936

Paris, October 18, 1927.

DEPARTMENT OF STATE
NOV 3 1927
DIVISION OF
WESTERN EUROPEAN AFFAIRS

DEPT. OF STATE
OCT 28 1927
Division of
Foreign Service Administration

Recd November 1, 1927.

INDEX BUREAU

The Honorable

The Secretary of State,

Washington.

Sir:

FILED
NOV 3 1927

With reference to the Embassy's despatch No. 7839 of September 14, 1927, I have the honor to request that if a reply has not already been mailed to the Embassy the Department will telegraph the Embassy what reply should be made to the invitation of Dr. Serge Voronoff of the College of France to send a mission from the United States to Algeria to inspect his gland grafting experiments with sheep on November 4th next.

The Department's instruction No. 2401 of August 24, 1927, directed the Embassy to inform Dr. Voronoff that it did not appear possible for sheep specialists of the Department of Agriculture to arrange their itineraries so as to be at Algeria on October 20th, the date originally suggested. However, the Department's attention was invited

in

in Embassy despatch No. 7794 of August 22, 1927, and again in Embassy despatch No. 7839 of September 14, 1927, to the fact that the date for the meeting had been postponed until November 4th. The Embassy is unable to reply to Dr. Voronoff with regard to this latter date until further instructed and, in view of the shortness of the time now intervening, it is pointed out that a reply if mailed would hardly arrive before the opening of the meeting.

I have the honor to be, Sir,

Your obedient servant,

For the Chargé d'Affaires ad interim:

Edwin C. Wilson,
First Secretary of Embassy.

In triplicate.

November 1, 1927

2487

To the American Chargé d'Affaires ad interim,

Paris.

The Secretary of State acknowledges the receipt of despatch No. 7936 of October 18, 1927, from the Chargé d'Affaires ad interim in further relation to the invitation extended through Doctor Serge Voronoff of the College of France to the United States to send a mission to Algeria to inspect his gland grafting experiments with sheep being conducted at the Algerian breeding station, which meeting was postponed from October 20th until November 4th.

In reply the Secretary of State refers the Chargé d'Affaires to instruction No. 2464 of October 11, 1927, on the subject.

851 R. 62222/7

FA:FM:CLW:SS

CR wl
Oct. 30, 1927.

H.A.H.

26A1/21

DEC 5 1927

INDEX BUREAU

DEPARTMENT OF STATE
A-G/COE
DEC 13 1927
ASSISTANT SECRETARY OF STATE

Copies hereof to be sent to Com Agri
Copy also to
and DEC 13 1927

Report No. 88, Voluntary.

Algiers, Algeria,

Date of Mailing, November 14, 1927.

From Clerk: .....
Robert McC. English.

Approved: .....
Lewis W. Haskell,
Consul General in Charge.

DEC 12 1927

* * * *

VORONOFF METHOD OF LIVE STOCK IMPROVEMENT.

Dr. Sergè Voronoff held in Algeria, beginning Friday November 4, 1927, and continuing until the 9th, an exposition of his gland grafting activities.

The program

The program included lectures and visits to farms in Algeria where his methods have now been in practice three to four years. Delegates from England, Argentina, Spain, Italy, Czechoslovakia and France were present.

The United States was invited to send delegates but it was not found practicable as the invitation was received too late to make the necessary arrangements. For this reason this office has followed the activities of Dr. Voronoff and the delegates during their recent visit.

In a preliminary interview Dr. Voronoff stated that he had been very successful in his work with sheep and bulls. One of his most famous examples is a bull named "Jackie" which is now in his twenty-third year and still able to reproduce. This animal has been grafted twice and, while plainly showing his years, he still retains an amazing vigor. The delegates who visited the farm of the Société Agricole Algérienne at Bou Chelev, where this famous bull is kept, were greatly impressed. Some doubted his age as being twenty-three, but all were satisfied that the physical indications showed him to be at least eighteen.

Dr. Voronoff's work with sheep was shown at Tadmit, not far from Laghouat, where besides showing examples of improved stock, the operation itself was performed.

The

The attitude of most of the delegates showed that they were heartily in support of Dr.Voronoff's work. His abhievements in Algeria were further supported by the representatives of Spain and Italy, who claimed even greater success in their own countries after following his methods. The English delegates assumed from the outset a position of scepticism and accepted nothing until they were convinced that the evidence exhibited was in the nature of a proof. At the head of this groop was Dr. Crew of Edinburgh University who has already conducted experiments along the lines indicated by Dr. Voronoff, and also those of Dr. Steinach of Vienna. His complete report to the Ministry of Agriculture, London, will be transmitted when it is available. His preliminary statement indicated that his findings would be that the results shown here would serve to support the contentions of Dr. Voronoff but could not be accepted at this time as conclusive proof. The Argentine representatives assumed much the same attitude as the English and their finding differed only in minor points. Both groops were extremely impressed by what was shown them.

While it is not practicable to go into detail as to the technical methods employed by Dr.Voronoff,

for those

for those not already familiar then it may be said that by grafting to the testacles of the bull, ram, etc. those of another healthy male animal of the same species, the potency may be prolonged. The value of this is clearly evident to owners of valuable animals whose productive period is ordinarily limited to a short period of years. Besides this Dr. Voronoff has by the same means increased the size of the offspring in the case of sheep and consequently there is more wool produced per animal and more meat.

Points to be considered in this connection, and these as yet have not been fully delt with, are the advantages to be gained by increased production of wool per animal and the additional meat. It may be said, however, that in general the results are that the wool produced is of a finer quality and longer. The market for this type of wool is not definitely established. Also, while the meat may be more abundant there is apt to be a change in quality. Dr. Crew's report, it is hoped, will take up these points and comment on them in the light of his extensive experience.

As it was stated by one of the delegates, the mere exhibition of animals of greater size or prolonged powers of generation is not conclusive. Many examples can be quoted of animals long past the normal age who are still able to reproduce, and who have

undergone

undergone no operation of any sort. They are merely the irregularities one always finds in nature. The record kept of the animals was not found to be all that might be desired. Grafted and ungrafted males were kept in the same pasture thus giving rise to the possibility of error. Although Dr. Voronoff insists that no errors occured.

Concerning Dr. Voronoff it may be said that his work in general is more popular than scientific. He makes a tremendous appeal by his personal magnetism. Many observers are carried away by the indications and by his talk than by actual research. As can be readily seen, the idea is one that has great possibilities, especially in Algeria where every effort is being made to develop the country and to furnish France with foodstuffs. The scarcity of good pasturage adds to the value of a larger variety of sheep which would produce more in proportion to the food consumed. His book "OLD AGE AND MY METHOD OF REJUVENATION" is to be followed shortly by one entitled "LA CONQUETE DE LA VIE" which will doubtless be translated into English in the near future. I mentioned above Dr. Seinach of Vienna, and while his method is not discussed, as it has a bearing on this subject, it might be well to mention the English translation by Paul Kammerer entitled "REJUVENATION".

The matter

The matter was considered here in all seriousness and the representatives of the various nations were men specially selected for their qualifications. Enthusiasm for the work of Dr. Voronoff was shared by all the delegates.

Enclosures: List of delegates.

Program of the exhibition.

862.2

RE:YM.

ENCLOSURE No. 1

to

REPORT No. 88.

LIST OF DELEGATES.

ENGLAND: Doctor F.A.E.Crew, of Edimburgh; Docteur F.A.A. Marshall, of Cambridge; of M.W.C., of Edimburgh, and Doctor Walton.

Argentine REPUBLIC: M. Juan, E. Richelet of the Legation of the Republic at London.

SPAIN: Don Miguel Echegaray, Don Santos and Doctor Canellas, all three of Madrid.

ITALY: Inspecteur General Nello Potticchia, of Roma; Doctor Vittorio Pettinari, of the University of Milan.

CZECHOSLOVAKIA: Professor Pardubsky.

FRANCE: Professor Moussu, of the Ministry of Agriculture; M. Curasson, of the Ministry of the Colonies; M. Ducloux, of Tunisia; and N... , of Morocco.

* * *

ENCLOSURE No.2

to
REPORT No.88

PROGRAM OF THE VISIT OF INTERNATIONAL DELEGATES TO Dr. SERGE VORONOFF'S GLAND GRAFTING STATIONS IN ALGERIA.

Friday, November 4, 11 a.m.

The delegates will be received at the Service d' Elevage, 26, Boul. Baudin, by General Meynier, the Director of the Territoires du Sud, and other Government representatives.

5.30 p.m. The Governor General will receive the delegates at the Summer Palace. After the reception, the delegates will go to the Service d'Agriculture, where Dr. Voronoff will deliver a lecture.

Saturday, November 5, 1.15 p.m.

The delegates will leave for the farm of the Sté. Agricole Algérienne at Bou Chelev, where they will see the bulls that have been subjected to Dr.Voronoff's treatment.

8 p.m. Dr. Voronoff will offer a banquet to the Delegates at the Hotel St. George.

Sunday, November 6. The Delegates will leave in a large motor-car seating 14 persons for Laghouat, 274 miles South of Algeria.

Monday, November 7. Rest at Laghouat, where the authorities will entertain the Delegates.

Tuesday, November 8.

Departure for Tadmit, to inspect the principal station, and see all the results obtained by Dr. Voronoff's system. Grafting operations will be conducted in the presence of the Delegates, who will be given an opportunity of performing operations themselves. Evening of November 8. Return to Laghouat.

November 9. Return to Algiers.

NO. 330

274980

AMERICAN CONSULATE

ALGIERS, ALGERIA.

March 19, 1928.

SUBJECT: Transmitting British Mission's Report on Dr. Voronoff's Experiments on the Improvement of Livestock.

Full Copy to Corn Agr

APR 5 1928

THE HONORABLE

THE SECRETARY OF STATE,

WASHINGTON.

SIR:

Referring to the report of this office (No 88, dated November 14, 1927, "Voronoff method of Livestock Improvement") I have the homor to transmit herewith the report of the British Mission on Dr. Serge Voronoff's experiments in Algeria.

I have the honor to be, Sir,

Your obedient servant,

Lewis W. Haskell,
American Consul General in Charge.

Enclosure.
862.2
RE:MLI

274980

MINISTRY OF AGRICULTURE AND FISHERIES

BOARD OF AGRICULTURE FOR SCOTLAND

Report

ON

Dr. Serge Voronoff's Experiments

ON THE

IMPROVEMENT OF LIVESTOCK

By

F. H. A. MARSHALL, Sc.D., F.R.S.,
F. A. E. CREW, M.D., D.Sc., Ph.D.,
A. WALTON, Ph.D., and
Wm. C. MILLER, M.R.C.V.S.

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CONTENTS.

	Page
Foreword	4
Introductory	5
Itinerary	6
The Bull Jacky	6
Report of Delegates	9
Comments	9
The Sheep Experiments	11
Comments	15
General Conclusions	17

APPENDICES.

Appendix I :	Technique of the Voronoff operation for the implantation of testicular grafts by Wm. C. Miller, M.R.C.V.S.	19
Appendix II :	Report on wool samples by J. A. Fraser Roberts, M.A., B.Sc...	24

FOREWORD.

In consequence of the public interest in the experiments of Dr. Serge Voronoff, of the Collège de France, Paris, as applied to livestock, it was considered desirable that an authoritative report should be prepared for the information of the Ministry of Agriculture and Fisheries and the Board of Agriculture for Scotland.

Dr. F. H. A. Marshall (Reader in Agricultural Physiology in the University of Cambridge and Joint Director of the Animal Nutrition Research Institute), Dr. F. A. E. Crew (Director of the Animal Breeding Research Department, University of Edinburgh), Dr. A. Walton (of the Animal Nutrition Research Institute, Cambridge), and Mr. Wm. C. Miller, M.R.C.V.S. (of the Royal (Dick) Veterinary College, Edinburgh), were accordingly requested to visit Algeria for this purpose. Their report is printed in the following pages. The Ministry and the Board are indebted to the members of the mission for their readiness to undertake the journey and for the manner in which they have carried out the task confided to them. Acknowledgment is also due to Dr. Voronoff for giving every assistance to the mission, to the Government of Algeria and to the British Officials at Algiers.

MINISTRY OF AGRICULTURE AND FISHERIES,

January, 1928.

REPORT ON THE WORK AND CLAIMS OF DR. SERGE VORONOFF.

Introductory.

In accordance with arrangements made between the Ministry of Agriculture and Fisheries and Dr. Serge Voronoff, of the Collège de France, Paris, a delegation consisting of :—

Dr. F. H. A. Marshall	Cambridge.
Dr. A. Walton	
Dr. F. A. E. Crew	Edinburgh.
Mr. Wm. C. Miller, M.R.C.V.S.	

visited Algeria in November, 1927, there to meet Dr. Voronoff and to examine his experimental animals and records.

This British delegation was joined at Algiers by the following representatives of other countries :—

Dr. Richelet	Argentine.
Professor Moussu	France.
M. Curasson	
M. Duchoix	
M. Potticchea	Italy.
Dr. Pettinari	
Don Miguel Echegaray Romea	Spain.
Don Santos Aran	
Dr. Canellas	
Professor Pardubsky	Czecho-Slovakia.

The objects of the visit were (1) to witness the application of the Voronoff method of testis-grafting to animals of agricultural importance ; (2) to examine certain animals which already had been subjected to this technique ; and (3) to examine and to report upon the claims made by Dr. Voronoff concerning the economic value of this method in the field of practical livestock breeding.

The Voronoff method of testis-grafting consists essentially in the implantation of pieces of testis taken from one male on to the surface of the testis of another male (preferably of the same species). The scrotum is opened, the surface of the exposed testis is scarified in order to evoke a mild and aseptic local inflammation and to promote the rapid formation of new blood connections between the testis and the implant, and on to this scarified area pieces of testis from another animal are stitched. The operation is described in detail in Appendix I of this report, see page 21.

It is claimed that this additional testicular material retains its histological integrity for a considerable time and exerts a physiological action which can replace or reinforce that of the animal's own testis and so restore or increase the degree of expression of those characters of the animal which are dependent for their expression and full maintenance upon the proper functioning of the active sex-gland. Dr. Voronoff holds the opinion that not

only are the *sexual* characters thus dependent upon the physiological activity of the testes, but also that these sex-glands play an all-important rôle in the maintenance of general vigour.

Dr. Voronoff has employed his technique of testis-grafting in the cases of :—

(*a*) *The senile male whose own testes have become insufficient in their physiological activity.* It is claimed that following upon this operative treatment the old, decrepit, and infecund male becomes "rejuvenated," that his reproductive powers are restored.

As an example of the application of this technique, the delegates were shown the rejuvenated bull Jacky.

(*b*) *The sexually immature male whose testes have not yet profoundly affected the developing characterisation of the individual.* It is claimed that, following upon this treatment, growth and general vigour are stimulated to a fuller expression, as evidenced by the attainment of a larger body size and a greater sexual potency, and that these characters are in part at least transmitted to the offspring. An example of this is the case of the sheep examined by the delegates at Tadmit.

Itinerary.

The British delegates left London on the 31st October, and reached Algiers on the 2nd November. On the 4th they attended an official reception and a lecture by Dr. Voronoff. The following day they visited Bou Ghellel farm, 18 miles from Algiers, to see the bull Jacky, and then left for Laghouat (274 miles from Algiers) and Tadmit to see the sheep and to witness the Voronoff operation. The delegation returned to London on the 12th November.

THE BULL JACKY.

As an instance of rejuvenation of the aged male, the delegates were shown the bull Jacky. An account of this experiment is published in *The Study of Old Age and My Method of Rejuvenation*, Dr. Serge Voronoff, 1926, *p.* 60, from which the following excerpts are taken :—

"During my stay in Algeria, where I went in order to apply my method of grafting to sheep belonging to the Société Agricole Algérienne and to the General Government of Algeria, M. Georges Nouvion, the director of the above mentioned Society, requested me to rejuvenate an old bull. Beautiful stud bulls are constantly brought over at great expense from France in order to improve the native bovine race, which is relatively much weaker and smaller. These bulls terminate their career when 10–12 years old, when they have to be replaced at great cost to the breeders. To prolong the period during which those stud animals are capable of fecundating is an economic problem of great importance. For

this reason the Société Agricole Algérienne requested me to attempt the experiment on one of their old bulls, Jacky, who was 17 years old and who had been quite useless for stud work for 2 years. I accepted this offer and went to the Bou Ghellel farm, near Blida, where I was able to see for myself that Jacky was indeed in a lamentable state. Very thin, with dull eyes hardly showing in a head stamped by the characteristics of old age, with lustreless hair, Jacky kept away from the main flock and took no interest in his female companions. His place had been taken at their side by a young rival, whom Jacky avoided for good reasons. The young bull attacked Jacky whenever the latter approached with the best and most peaceful intentions, and Jacky had to fly as he was incapable of putting up the slightest resistance against his adversary.

"On March 5, 1924, I grafted into him the testicles of a native 3-year old bull in front of a great number of breeders interested in my experiments. My two assistants had come with me from Paris. They were Dr. Puelma and Veterinary Surgeon Schmidt. They were accompanied by Dr. Barillon and Veterinary-Surgeons Pons, Bosselut, Wagner, and Barlette. These gentlemen lent me their most precious aid as indeed it is no easy matter to operate upon a bull even when it is old, nor is it a matter free from all danger. Although the animal was made to lie upon its side and was kept in this position by some 10 Arabs, it gave frequent signs of impatience which resulted in the frequent upsetting of all the surgeons. . . .

"On June 27th, I received a letter from M. Georges Nouvion informing me that the experiment had been completely successful.

"*Extract from letter received from M. Nouvion.*—'The bull we operated upon is keeping very fit ; its hair has become glossy, its eyes sparkling and, what is even more interesting, the animal now seems full of ardour. During the last few days he was put with a cow that was on heat, and he covered this animal 4 times during the course of the morning, which number is quite a record. Since then he is able to continue to cover animals brought to him.'

"*Extract from another letter from M. Nouvion, 20th March,* 1925.—'I have told you in a previous letter of the prowess of Jacky, whom you grafted about this time last year. At the time of your intervention this animal's reproductive career was completely ended and I was upon the point of selling him to the butchers. About 3 months after the operation, during May, 1924, he was able to resume his reproductive functions and he has scarcely ever ceased to exercise these save when it has been impossible to furnish him with partners. Among the cows with which he has been coupled soon after the operation, three have recently produced calves. Two of these bear all the characteristics of the race of their sire and the third is undoubtedly his offspring.

'In order to give you precise details of the way in which he behaves, I quote extracts from the service book kept at the farm :

Cow.	Date.	No. of services.
Grisette ..	Jan. 19th, 1925 ..	4
	Feb. 9th, 1925 ..	3
Negresse ..	Jan. 20th, 1925 ..	1
	Feb. 4th, 1925 ..	1
	Feb. 5th, 1925 ..	2
Mandarine	Feb. 20th, 1925 ..	1
Bichette ..	Jan. 24th, 1925 ..	3
Zorah ..	Jan. 26th, 1925 ..	3

'Jacky still remains in the most perfect condition. The eyes are bright and the hair glossy. He has again become very vigorous, so much so that when he is locked up he is able to jump over very high barriers in order to join the herd.' "

Dr. Voronoff continues : " I saw this animal again on the 8th of April (1925) . . . and I found this bull completely changed and the possessor of its pristine vigour and sexual ardour. A year after the operation, not only do the advantages of the graft remain, but they even seem to increase with time. . . . I do not know whether this bull will live longer than other animals, only the future can tell us. But Jacky has already resisted in a surprising fashion the dearth of water and food that occurred last summer, and it is quite logical to suppose that an animal that has regained such magnificent health and such great strength will live longer than the one which shows signs of extreme weakness and which is therefore an easy prey to pathogenic organisms."

At the time of the inspection of this bull by the delegates the following additional information was secured.

Jacky's breeding record for 1925 and 1926 is as follows :—

1925	.. .. ..	6 calves.
1926	.. .. ..	3 calves.

It was stated that three years after the operation in 1924, Jacky, though still in fair physical condition, began to show once more enfeebled reproductive powers, and it was then decided to perform the Voronoff operation for the second time. This was carried out in April, 1927. (It is of interest to note that the graft implanted in April of this year cannot now be clearly distinguished on palpation of the scrotum.)

Three months later Dr. Voronoff received from M. Nouvion a telegram to the effect that Jacky's reproductive powers had returned.

Since this second operation, Jacky has served 4 cows, and it was stated that all of these are in calf.

Report.

This bull is a Limousin (ex Limousin, Imported, × Limousin, Algerian bred). The bull's general condition is excellent, skin pliable, and coat glossy. There is no appearance of whitening on the muzzle (characteristic of old bulls in Britain).

Dentition table :—

2 centrals	.. ..	stumps only.
2 intermediates	..	stumps only.
2 laterals	.. ..	crown, $\frac{1}{4}$-inch.
2 corners	.. ..	crown, $\frac{1}{4}$-inch.

Horns :—14 (or 15) rings can be discerned.

There is an opacity in the right eye. On the scrotum there is, on either lateral aspect, a linear scar. On palpation no definite testis graft could be recognised, but there are plentiful adhesions. The right testis is about $1\frac{1}{4}$ times the bulk of the left.

The bull Jacky is an old animal and has been subjected to operative treatment (*e.g.*, the Voronoff operation).

Two cows in season (but not showing marked signs) were brought to this bull. The penis appeared within $3\frac{1}{2}$ minutes, and the first attempt at service was made $\frac{1}{2}$ minute later. Erection was normal but penetration did not occur. (This could not be regarded as a fair test for the bull, for he had been handled by some score enthusiastic but often unskilled hands, was hemmed in a ring of ardently debating and admiring people, and controlled by the unco-ordinated efforts of 4 Arab herdsmen). Everyone, including Jacky and the cows, then proceeded to a paddock where already 7 of Jacky's reputed offspring awaited attention. These ranged from youngsters of $4\frac{1}{2}$ months to a young bull 18 months old. The young bull promptly attempted to serve one of the cows, indicating that she was on heat. Jacky himself made no further attempt at service.

The 7 calves presented no reasons for any suggestions that they were not the issue of Jacky. That is to say, none of the British delegation had a sufficient knowledge of the genetics of this particular breed of cattle to make any comment on the statement that they were sired by this bull.

The Limousin would seem to belong to the triple-purpose type of cattle (draught, meat, milk), maturing slowly and not attaining physical maturity until $2\frac{1}{2}$–3 years old.

Comments.

The case of Jacky is regarded by Dr. Voronoff as a complete and unqualified substantiation of his claims concerning rejuvenation.

It is reasonable to offer the following criticism :—

1. Though stud bulls in Algeria usually are discarded at the

age of 10-12 years, Jacky was kept beyond this time ; he was in use when 15 years old, and even when useless he was still retained for two years before the operation was performed. It can be assumed that Jacky was an exceptional bull, prized above his fellows. It is possible, therefore, that he may have reacted more fully to the grafting than would an average bull. It is possible also that the treatment—food and general care—during the convalescent period following the operation may have contributed largely to the results, although it was stated that this bull received at no time any special treatment.

2. Since Jacky was unique in being alive at 17, there was no control with which to compare him. Bulls in Great Britain are commonly discarded at an early age (4-5 years old), not because of their senility, but because they become too heavy to serve heifers or, as a result of close confinement, they develop an uncertainty of temper and may exhibit a period of transient reduction in fertility. They are consequently fattened off whilst this procedure still remains profitable. In the case of stud bulls 10-15 years is not a very exceptional age to which an animal may retain its sexual vigour, and under range conditions the life may be still longer. Exact data on this question are necessarily difficult to obtain.

It is not rare for a male to endure periods of general ill-health. There is no critical evidence in the case of Jacky that this bull was not suffering from transient ill-health or malnutrition prior to the operation, and the fact that the return to glowing health after the grafting occurred in spring or early summer may not be without significance.

3. The table of services on page 8 shows that during 2 months Jacky gave a total of 18 services to 5 cows, and yet the total number of offspring for this year was 6, an exceptionally low fertility ratio.

4. The vague suggestions of doubt concerning the paternity of the calves is disturbing. (See pages 7 and 9.)

Of course, one case alone cannot be regarded as a final and conclusive demonstration of rejuvenation, and the case of Jacky must, therefore, be considered against the background of Dr. Voronoff's other work on sheep, goats, and man.

It has to be acknowledged that in all these cases there exists a strong possibility of error in the interpretation of the results obtained in that an accurate comparison between experimental and control material of the same age and maintained under identical conditions has not been and could not be made. Variables other than those incident upon the actual operative interference enter into this experimentation, and these cannot be measured and assessed (*e.g.*, the psychological in the human).

The considered opinion of the British delegates is that, whilst the case of Jacky supports the hypothesis so ably adumbrated by

Dr. Voronoff, it cannot, nor can the other cases recorded by him, be accepted as a final and conclusive proof of the validity of his thesis concerning rejuvenation.

The British delegates are of opinion that it is eminently desirable that further and more critical work should be undertaken, for this matter of rejuvenation possesses considerable scientific interest.

From the point of view of the agricultural economist, it is an open question whether this method, even if and when its merits have been fully demonstrated, can become of any considerable value in Great Britain save in exceptional cases, *e.g.*, a dairy bull yielding daughters with exceptional milk records, or a race-horse with a remarkable track record and outstanding offspring.

Alternative methods (*e.g.*, improved management) are available for increasing or extending the usefulness of valuable sires.

In Great Britain the supply of high class sires in their prime is adequate, and the fertility ratio—the number of offspring to the number of services—is by no means the least important of the qualifications of a sire. In old age there may be a drop in this ratio, and for this reason preference is given to the younger male. No evidence has yet been adduced which shows that this method of rejuvenation raises again the fertility ratio of the aged sire. In the sire-importing countries, on the other hand, it is indeed conceivable that the prolongation of the sexual life of the sire, even though at a lower fertility level, would be desirable, and for this reason it is urged that further experimentation should be encouraged.

It should be noted in passing that the calves shown and recorded as the offspring of Jacky when more than 17 years old, present no indications of "inferiority." There was nothing about them which suggested that the offspring of a rejuvenated aged sire are less vigorous than those sired by a young male in his prime.

THE SHEEP EXPERIMENTS.

The following is a translated extract from Dr. Voronoff's paper in the C.R. Séances de l'Acad. des Sciences, T. 185, p. 480, 22nd August, 1927.

"Encouraged by the results obtained by me at the Collège de France, I wished to extend my experimentation to entire flocks of sheep. In order to protect myself from criticism, and so that the results might be controlled by competent and official supervision, I applied in 1924 to the Government of Algeria, which maintains a flock of some 3,000 sheep under the general supervision of M. Trouette, Inspector of Livestock Breeding to the Government of Algeria. The grafting of the lambs was started in October 1924. The livestock service issued its first report in 1926. From this report, addressed to the Ministry of Agriculture, I extract the following figures:—

"The mean of the weights of rams 2 years old non-grafted is

61·3 K.[1] that of grafted rams of the same age " [*and raised under the same conditions of husbandry* ?][2] " is 68·5 K.[1] The increase in body weight is therefore, 7·2 K. in favour of the grafted, an increment of $\frac{1}{8}$ approximately. The average weight of the fleece of the non-grafted rams is 3·1 K., that of the grafted 3·75 K., a difference of 650 gms. in favour of the grafted, an increment of $\frac{1}{5}$.

" At the time when this report was drawn up, the grafted rams had already produced lambs, these then being 5 months old. The mean of the weights of these lambs sired by grafted rams is 38·2 K.[1] whereas the mean of the weights of the lambs of the same age sired by non-grafted rams is only 30·1 K.[1] The difference in favour of the offspring of the grafted sires is 8·1 K., an increment of more than $\frac{1}{4}$. The average weight of the fleece of the offspring of the grafted sires was 980 gms. ; that of the offspring of the non-grafted sires was 680 gms., a difference of 300 gms. per head, about $\frac{1}{3}$ more.

" A year after this report was drafted, I myself visited Algeria, in April, 1927, and inspected the animals, under the supervision of M. Trouette and Commandant Cottenceau. Of the 11 government flocks, 2 are composed solely of ewes sired by grafted rams. In my presence, 2,800 sheep were weighed, clipped, and each fleece weighed.

" The results are approximately as those given above. The animals out of grafted sires weigh on the average $\frac{1}{5}$ more than those sired by non-grafted rams, and their fleeces show an advantage in weight of $\frac{1}{6}$.

" It is, therefore, a general and constant fact that sires, grafted before puberty, transmit to their offspring of the first generation, at least in part, those qualities newly acquired by them as the result of the grafting. Without committing oneself to any statement as to what might possibly be obtained by grafting in turn the rams of the first generation sired by grafted rams, it can be stated that these first generation rams, having benefited through the improvement of their sires, possess an increased value both in weight of body and of wool, and that this in itself constitutes a considerable advantage to the sheep-breeder. One grafted ram suffices for 50 ewes ; 100 grafted rams, therefore, can fecundate 5,000, and these will yield about 5,000 offspring with superior qualities of body weight and of wool.

" Through the employment of this technique, then, in any country the production of mutton and of wool can be considerably increased."

It follows from the above that Dr. Voronoff claims that not only (1) are the quantity and quality of mutton and wool improved in the case of the rams grafted before puberty, but also that (2) this improvement in characterisation is transmitted to

---

(1) It would appear that these weights are those of a *pair* of animals, the actual weight being about half that indicated.

(2) Words in italics are not Dr. Voronoff's.

the generation sired by these, to both male and female offspring, by the ordinary processes of reproduction.

This account cannot be regarded as a satisfactory scientific document, since it does not include information which has to be considered if the reader is to assess the value of such data as are given.

At Tadmit the following information was forthcoming. The sheep of Algeria are of Merino stock and are distinctly heterogeneous in their characterisation. There is considerable variation in horns, fleece composition, and in colour. M. Trouette, since 1917, has been establishing, by continued selection among the governmental sheep at Tadmit, 4 flocks.

1. The Tadmit flock .. .. short-tail.
2. The Zahrez flock .. .. white-face.
3. The Ouled Aïfla flock .. yellow-face.
4. The Harazlia flock .. .. red-face.

(The discards—off-types—from these constitute the commercial flock.)

The British delegates are indebted to Major Bodley and to Major Robinson, of Laghouat, for the following items of information:

(1) The wool yield of an average ewe is $2\frac{1}{2}$-3 K., that of a ram being somewhat heavier.

(2) The value of this unwashed wool is 10 fcs. per K. in the average year.

(3) The wool is sold in bulk to a syndicate.

(4) Shearing takes place in April-May (earlier in a "hot" year). (No wether fleeces were available for inspection for the reason that the surplus male lambs are sold at about the age of 9 months to specialist feeders).

(5) A flock consists of 250 sheep (including 12 rams, *i.e.*, 1-20), together with a few goats to encourage ranging. It is a self-contained unit in charge of the nomadic Arab shepherds.

In good years there are 2 lambing seasons, November and May, the tupping seasons being June and December. Nutritional agencies condition the incidence of œstrus, especially the second season in the winter. Twinning is exceptional, but sterility is no more than 5 per cent. under favourable nutritional conditions and in a single tupping season.

At Tadmit six groups of sheep were exhibited :—

1. Rams of the commercial flocks—20 weighed.
2. Grafted rams .. .. ..—20 ,,
3. Daughters of 1 ... .—20 ,,
4. Daughters of 2 .. .. ..—20 ,,
5. Wethers, ex 1 .. .. ..—10 not weighed
6. Wethers, ex 2 .. .. ..—12 not weighed

The individuals of the first 4 groups were weighed in the presence of the delegates. The weights are given in the following table :—

Weight of Sheep in Kgs.

1 Commercial rams.	2 Grafted rams.	3 Daughters of commercial rams.	4 Daughters of grafted rams.
29	44 (4 teeth)	27 (2 teeth)	37 (2 teeth)
33	45 (2 ,,)	28 (2 ,,)	38 (2 ,,)
35	41 (2 ,,)	29 (2 ,,)	30 (2 ,,)
29	47 (2 ,,)	29 (2 ,,)	43 (2 ,,)
32	41 (2 ,,)	31 (2 ,,)	44 (2 ,,)
37	43 (2 ,,)	32 (2 ,,)	39 (2 ,,)
34	37 (4 ,,)	34 (2 ,,)	36 (2 ,,)
39	40 (2 ,,)	30 (2 ,,)	57 (2 ,,)
34	39 (4 ,,)	30 (2 ,,)	36 (2 ,,)
31	41 (2 ,,)	32 (2 ,,)	36 (2 ,,)
29	42 (2 ,,)	30 (2 ,,)	39 (2 ,,)
34	42 (4 ,,)	35 (2 ,,)	38 (2 ,,)
29	43 (2 ,,)	35 (2 ,,)	40 (2 ,,)
33	38 (2 ,,)	33 (2 ,,)	43 (2 ,,)
24·5	44 (2 ,,)	36 (4 ,,)	52 (2 ,,)
34	39 (4 ,,)	36 (4 ,,)	43 (2 ,,)
27	39 (4 ,,)	34 (2 ,,)	41 (2 ,,)
31	42 (2 ,,)	34 (2 ,,)	42 (4 ,,)
30	41 (2 ,,)	32 (2 ,,)	40 (2 ,,)
32	46 (2 ,,)	36 (2 ,,)	39 (2 ,,)
Average 31·82	41·70	32·15	40·65
	9·88		8·50

Notes.

1. The 4-toothed rams, column 2, were operated upon in October, 1926, the rest in April, by members of the veterinary staff at Tadmit.

2. Of the individuals of groups 3 and 4, in each group 7 were pregnant and 13 apparently non-pregnant.

3. The grafted rams were from the commercial flocks. It was stated that there had been no deliberate selection for good qualities in their choice, but that in fact, the bias had been towards the selection of only the really "bad" specimens. This, it will be noted, is selection of a kind.

4. The wether groups were not weighed, but it was manifest on inspection that the individuals of the group "wethers ex grafted sires" were larger and heavier than those of the other group.

5. The groups weighed were stated to be representative of the various classes. It was not possible to verify this statement.

It is necessary, however, to call attention to the fact that the increase of weight shown by the grafted rams is as much as one-third of the body weight and very considerably exceeds the claim of an increase of one-fifth made by Dr. Voronoff in his previous report. (*See* page 12.) It is possible that differences in the age of the animal or the time of year at which weighings were made would account for this apparent discrepancy, but an explanation of this should have been given to the delegates. The investigation has been considerably handicapped by lack of detailed information of this type. The British delegates would urge Dr. Voronoff to publish a full and detailed report of the whole experiment with an account of the methods of management, dates of operations and weighings, number of animals operated upon, number of failures and method of diagnosis, and complete lists of all individual weights of the experimental animals and the controls in order that such data might be subjected to statistical analysis and true comparisons made.

Comments.

1. The method of demonstration was that of illustrating by samples what was regarded as an established fact rather than that of offering precise evidence for consideration.

2. No evidence of the histological integrity of the graft was available. It was impossible to form a critical opinion concerning the persistence of the graft. Scars were present on the scrota of the grafted group.

3. Definite and detailed information concerning the numbers of animals involved in the experiment or concerning the pedigree and relationship of the individuals exhibited was not forthcoming. It was suggested that such information as this was only in possession of the shepherds.

4. It appeared that statistical safeguards and the requisite demands of a properly conducted genetical experiment had not been observed, nor had the results been subjected to statistical treatment.

5. The sheep exhibited were heterogeneous in their characterisation. In the absence of accurate pedigree records, it was impossible to form any opinion concerning the relative rôles of hereditary constitution and of environmental agencies in the production of this heterogeneity. Such mass selection as was practised must have made the selection of improved types difficult. It might, on the other hand, have favoured the existence within the flocks of exceptional hereditary constitutions which, on isolation and under the conditions of the experiment, would lead to a better characterisation.

6. It was evident that rigid precaution to avoid all possibility of (unconscious) selection of favourable types had not been taken.

For instance, in the original experiment it was stated that about 12 rams had been grafted. At the lecture in Algiers, Dr. Voronoff stated that 15-20 per cent. of grafts were unsuccessful, this figure being obtained presumably from the larger series of experiments conducted later. Now on a small sample of 12, 15-20 per cent. (as determined on a large sample) might imply a considerable incidence of failure. Such an incidence might be selective, in that the weaker animal might succumb more readily. It was not explained how failure of the graft had been diagnosed. If determined by its apparent effect on the vigour of the animal, the possibility of selection at once becomes apparent.

7. Throughout the greater part of the year, the sheep are under the sole charge of the native shepherds, who, though undoubtedly responsible and competent herdsmen, can scarcely be expected to appreciate the finer points of a critical experiment. The possibility that nutritional inequalities may have affected the results remains.

8. The method of control is unsatisfactory. Small isolated experimental flocks are compared with a much larger population which receives the offtypes from the flocks undergoing selection. The average weights of the controls will, therefore, be influenced by the weights of these rejected animals.

9. Weighing the samples submitted revealed considerable differences between grafted and non-grafted and between the offspring of these. Handling suggested that, as far as mutton points were concerned, more than one type was being examined with some gradations between them, and that these transmitted their congenital characters more or less faithfully. Chance or unconscious selection among the parental generation might account for the superiority of the progeny of the grafted rams, the superior mutton points having been transmitted. It is difficult to believe that such marked skeletal differences as were found would result from the action of the sexual hormone as suggested by Dr. Voronoff's hypothesis. On the other hand, a marked influence on the rate of growth might have been conducive towards an "improved type." The growth rates have not been determined, but it was inferred that the grafted ram and its offspring of both sexes grew faster in a unit of time than the non-grafted animals of the general flocks.

10. There was so much variation in the fleeces of all the groups that it was not possible to form an accurate opinion concerning the effect of the operation upon wool quantity and quality. It is stated that there is an increment and an improvement. There was no suggestion that the wool from these improved animals had been sold for a higher price per unit weight. Samples were brought to Britain and are reported on briefly in Appendix II of this report—*see* page 24.

11. In considering the economic aspects of this experiment it must be pointed out that the increment of body weight and fleece attained by the grafted sires can have no value in comparison with the cost of the operation. The number of rams retained in a commercial flock in this country is about 1 ram to 70 ewes and the flesh and wool of the ram are inferior in quality. In order to obtain an economic return from the surplus males, they are castrated. The only claim worth considering economically is that the offspring of the grafted ram, males, females and castrates, inherit desirable characteristics from their parent. In this country, and generally where breeding has achieved a high standard of attainment, there is a close correlation between cost of upkeep, breed and conformation of the sheep, climatic and nutritional conditions and economic demands. It is an open question whether changes such as those claimed for the experimental sheep would entirely fulfil existing requirements. For example, it is not every market that demands a sheep larger than that now supplied. An editorial comment on these experiments may be cited. It is taken from *The Meat Trade Journal*, Nov. 17th, 1927: "Dr. Voronoff, the famous gland-grafting scientist, claims to have produced 'super-sheep.' Results of his experiments in South Algeria have been demonstrated to an international mission of agricultural experts. Grafted sheep were observed to have gained 22 lbs. in flesh and 24½ ozs. in wool, compared with ungrafted sheep. Whatever may be said for the increase in wool, no meat trader wants heavier carcases of mutton." It must be pointed out, however, that the more rapid attainment of "weight for age" is of considerable economic importance, provided this is considered in relation to the cost of upkeep. It is also necessary to state that in this country it is improvement in *quality* of the wool rather than quantity which is eminently desirable.

It is possible that the continuation of the experiments at Tadmit will eventually demonstrate the success or failure of the method since the experiments are being repeated on a larger scale.

Conclusions.

The claim of Dr. Voronoff to effect rejuvenation of the aged and decrepit male by the operation of testis grafting is possibly justifiable. The evidence is, however, not based upon critical experimentation. Data on the duration of the graft and its effect upon the fertility of the operated animal are at present insufficient to warrant an estimate of the economic value. It is an open question whether this method, even if or when its merits have been fully demonstrated, can become of any considerable importance in Britain. Alternative methods of extending the usefulness of valuable sires are available and might be adopted with equal advantage.

The claim of Dr. Voronoff to increase the body weight and wool

clip of the ram by the operation of testis grafting applied to the immature animal is supported by the figures submitted and by the sheep shown to the delegates, but the conditions under which the experiments have been conducted, the inadequacy of the data submitted, and the methods of presentation of the data, exclude any possibility of forming a critical opinion. The direct economic advantages of the operation are negligible.

The claim of Dr. Voronoff that the improved characteristics shown by the grafted rams are transmitted to the offspring (males, females and castrates) involves the acceptance of a principle of heredity (the inheritance of acquired characteristics) which has not been substantiated in the realm of science and could only be so by appeal to the most critical and extensive research. These requisites have not been fulfilled in Dr. Voronoff's experiments. The results are capable of other explanations based upon established principles of heredity, for example, chance isolation of superior hereditary strains, aided possibly by (unconscious) selection.

Assuming, however, the validity of the claim, the economic value of increased body weight and wool clip would have to be considered not only in relation to climatic conditions and economic demands but to the increased cost of upkeep of the animals. The value of the method must also be compared with existing methods of improvement, for example, pedigree-breeding and selection, importation of superior stock, progeny tests, and the like.

Dr. Voronoff's claims have had wide publicity in the popular and agricultural press and have possibly been accepted by a section of the public for the most part unfamiliar with the usual criteria of scientific judgment. For this reason and because questions of considerable scientific interest and some economic importance have been raised, it is highly desirable that the matter be put to further and more critical test in this country, where conditions are more favourable to scientific control.

The initiative displayed by the French authorities in Algeria in granting facilities to Dr. Voronoff for these experiments is to be highly commended, and the devotion of M. Trouette and his subordinates to what must, in the circumstances, have been indeed an arduous task, is worthy of our most sincere admiration.

F. H. A. MARSHALL.

F. A. E. CREW.

A. WALTON.

WM. C. MILLER.

APPENDIX I.

TECHNIQUE OF THE VORONOFF OPERATION FOR THE IMPLANTATION OF TESTICULAR GRAFTS.

By Wm. C. Miller, M.R.C.V.S.

Introduction.

At the Breeding Station of the Government of Algiers, Tadmit, Dr. Voronoff, assisted by Veterinary Surgeon Bosselut, gave a demonstration of his method of operating upon sheep.

Two rams were chosen ; (1) the donor of the testicular material to be implanted, and (2) the host to receive the grafts. The demonstration was of the implantation of testis grafts from a vigorous adult into a young ram prior to the onset of puberty, with the object of increasing the quality and quantity of the mutton and wool, not of the individual only, but also of his progeny.

The ram to receive the grafts is operated upon between the ages of 8 and 10 months for preference, and should in no case be older than one year. Two grafts are implanted on each testis, one on the lateral and one on the medial aspect. The ram which is to supply the testes should not be less than 18 months, and better results are claimed with rams of 2 to 2½ years of age.

In the case of rejuvenation of the decrepit bull it would appear that testes from a vigorous animal 3 years of age are likely to be most satisfactory.

Apart from these differences, the operation is identical in technical details both for rejuvenation and for stimulation of early maturity.

Restraint.

Each animal was secured upon a table supported by trestles, and fixed in the dorsal position, the limbs and the horns being tied by ropes to suitable fixtures on the tables.

Preparation.

The wool on the scrotum was roughly clipped with scissors curved on the flat, and thereafter a creamy paste of barium sulphide in warm water was spread thickly over the scrotum with a spatula. This was allowed to act for from 5 to 10 minutes. The barium sulphide is a powerful depilatory, but must be used with care. It was accordingly removed and the scrotum thoroughly washed with soap and water as soon as the fine wool had been destroyed in order to check any excoriating action on the epidermis. This leaves the operation area free from wool and grease, and obviates the need for shaving.

The animal which was to furnish the grafts for implantation was prepared first, and that which was to receive the grafts was dealt with immediately afterwards.

After the seat of operation and the surrounding areas had been cleansed and the excess water lightly dried off with cotton wool, the scrotum of each animal was painted with Tr. iod. (2½ per cent.), and sterilized Holland cloths with stitched windows were arranged over the neck of the scrotum and fixed by tissue clips. For a second time, the scrotum was swabbed with tincture of iodine of the same strength.

Instruments.

The instruments, a list of which is given below, were sterilised in a " Gross and Barthelmy's " Formol Vapour Steriliser, together with rubber gloves, suture material, etc.

Instruments :—

4 scalpels,
2 pairs tissue scissors,
20 ,, artery forceps,
2 ,, dissecting forceps,
2 ,, vulsellum forceps,
4 ' Reverdin ' handled needles to take No. 000 or No. 00 catgut (chromicised), of which 4 tubes of each variety were used.

Materials.

2 large Holland cloths or towels with sewn windows large enough to accommodate the scrotum.

2 napkins kept in a suitable sterile receptacle.

A plentiful supply of gauze swabs, cotton wool swabs, and overalls, rubber gloves, etc., etc.

Anaesthetic.

No general anaesthetic or hypnotic was used (the sheep being a particularly bad subject for chloroform anaesthesia), but Novocaine solution (2 per cent. strength) was used to infiltrate the lines of incision in the scrotum of each animal (*i.e.*, that to be castrated and that to be grafted).

Note :—It would seem that the Algerian sheep are able to withstand handling and treatment which would be badly tolerated by sheep in Great Britain. It would be inadvisable to submit the heavier British breeds to prolonged dorsal recumbency without the use of a hypnotic, and unless 24 hours' fast had been enforced previous to operation, digestive derangements would be expected even after the use of a hypnotic. It is well known that asphyxia is extremely likely to result from keeping a sheep in the dorsal position for more than a few minutes. It is here suggested that

sheep to be operated on in Great Britain or countries where the breeds are of British origin, should be fasted for 24 hours before operation, and should receive a drench of chloral hydrate and potassium bromide (4 to 7 drachms of each substance, dissolved in ½ pint of treacle water), about 2 hours before operation. It is further suggested that the operating table should be arranged with its head end one foot higher than its tail end, so that pressure of abdominal contents on the diaphragm may be reduced.

The Operation.

The principles of the technique upon which Dr. Voronoff lays most stress are :—

(1) "Transplantation of the graft to the place which Nature intended it to occupy ;

(2) Irritation of the implantation surface by scarification and scratching in order to provoke a local congestion which will hasten the formation and growth of new capillary vessels destined for the nutrition of the graft ;

(3) Division of the grafts into thin slices to facilitate imbibition of all the cells."

Steps of Operation.

The two sheep were arranged on their tables side by side, and the receptacle with its sterile napkins was kept conveniently near to receive the testes.

1. *Castration.*—The scrotum of the first sheep was opened by a linear incision through the skin and tunica dartos, and the testicle, covered by its tunica vaginalis was exposed. The spermatic cord was infiltrated with novocaine solution, and subsequently severed, the testis being thus removed with tunica vaginalis intact. Haemorrhage was controlled by artery forceps applied before severing the spermatic cord. The epididymis was next removed by cutting with scissors, and the testis was wrapped in the sterile napkin and placed in the receptacle until required. The second organ was similarly removed. (The two wounds in the scrotum may be sutured if thought desirable.)

2. *Preparation for Implantation.*—The skin of the scrotum was incised by a linear incision about 3 inches long made towards the lateral aspect of the anterior surface, and reaching down to within an inch of the tip of the scrotal pouch. It was secured by artery forceps and reflected, being separated by blunt dissection from the underlying tunica dartos and loose scrotal fascia. Haemorrhage was controlled by pressure from artery forceps in the usual way. The tunica dartos was then secured by 4 pairs of artery forceps and between these an incision was made through it down to the outer surface of the tunica vaginalis, but the latter was left intact.

By retraction with the artery forceps the testis, covered with its tunica vaginalis, was exposed. Using the handle of a scalpel, two pouches were then made, one to the right and one to the left of the incision, between the tunica dartos above and the tunica vaginalis below (*i.e.*, into the loose peri-vaginal fascia).

These pouches facilitate rotation of the testis about its long axis, and also enable the grafts to be accommodated in them.

Scarification.—Using one of the Reverdin suturing needles, the outer surface of the tunica vaginalis was thoroughly scarified until it and the peri-vaginal fascia were sufficiently injured to cause a number of tiny bleeding points to appear over an area about $1\frac{3}{4}$ inches long and $\frac{1}{2}$ inch wide, on the lateral face of the testis (*i.e.*, the area upon which the first implantation was to be made).

Note :—To accomplish this, the testis must be rotated on its axis, in order to bring its lateral face into the scrotal incision. This is effected by seizing its lowermost pole with vulsellum forceps, or with a pair of artery forceps—taking care not to damage the cauda of the epididymis immediately below.

The survival of the graft depends upon the thoroughness of the scarification of the outer surface of the tunica vaginalis. The local aseptic inflammation and congestion so secured facilitate the growth of capillary loops into the superimposed graft, and the exudation of serum which follows the local injury enables the graft to live by imbibition until such time as vascularisation of its substance can occur.

3. *Preparation of the Graft.*—Meanwhile, the testis had been lying wrapped in a napkin, under conditions as nearly calculated to keep it living as possible. It was then divided into two halves by a longitudinal medial incision passing through the testiculo-epididymal junction. From the anterior edge of one-half of the organ a strip of albugineous coat, about $1\frac{1}{2}$ inches long and slightly less than $\frac{1}{2}$ inch wide, was cut by a pair of scissors in such a way that about $\frac{1}{4}$ inch to $\frac{3}{8}$ inch thickness of gland tissue was included.

(It is better to cut considerably more testicular tissue than this when taking the graft, and to trim it down to the required thickness subsequently. The flat glandular surface obviously must not be greater than the scarified area already prepared on the outer surface of the tunica vaginalis.)

The testis was wrapped in its napkin and returned to the container.

4. *Implantation of the Graft.*—The piece of testicular tissue thus prepared (free from all ragged and irregular shreds, and as uniform in outline as possible) was then laid on the scarified area, and fixed by 4 sutures of catgut, one at each of its ends, and one on either side about the middle of its length.

An extra suture may be required if the graft does not lie in accurate apposition with the underlying surface. The use of

Reverdin needles greatly facilitates the application of the graft and makes it more rapid. When suturing, care should be taken to ensure that in fixing the suture none of the numerous small peri-vaginal blood-vessels are included. To tie the sutures carelessly including vessels within the loop is liable to compromise the chances of survival of a portion of the graft, through what is virtually ligation of a section of its vascular field.

Thereafter, a second graft of similar size was prepared in an identical manner, and affixed on the medial aspect of the testis, exactly opposite the first graft, by a repetition of the technique. The medial face of the testis was brought into the operation wound in the scrotum and tunica dartos by rotating the testis in the opposite direction.

5. *Closure of the wounds.*—The artery forceps holding the dartos apart were approximated—the testis having first been released and arranged in its normal position in the scrotum, with one graft on its lateral and the other on its medial face—and the wound in the dartos was closed by a continuous blanket suture of catgut (No. 000). The skin edges of the scrotum were subsequently approximated and the wound closed by interrupted sutures of catgut (No. 00), (alternatively silkworm-gut may be used). Finally, the wound was sealed with collodion and cotton wool.

The following notes were made as the result of questioning Dr. Voronoff and his colleagues :—

1. The second testis of the animal is treated in exactly the same manner, receiving grafts on opposite sides, and finally, the sheep is released.

2. *After-treatment.*—Wounds should cicatrise in from 10-14 days, during which time the animal should be kept under supervision, but beyond the removal of the sutures (in 10 days) when silkworm gut scrotal stitches are used, no further operative interference is required.

3. *Untoward Sequelae.*

(*a*) Suppuration through infection of the operation wound is rare. The tissues of the sheep possess very considerable powers of resistance against ordinary bacillary invasion, and with the usual aseptic precautions healing is almost invariably by "first intention." When suppuration does occur, a subcutaneous abscess results, which, however, in no way injures the testis, though it may destroy the grafts. Re-grafting may be performed subsequently.

(*b*) Necrosis of the graft may occur when :—

(i) The graft has been too large or too thick to allow of rapid vascularisation ;

(ii) The area of implantation has been insufficiently scarified ;

(iii) Blood and serum have been allowed to coagulate over the surface of the tunica vaginalis through undue delay in the fixation of the graft on the scarified area. To avoid this, the surface should be freshly scarified immediately before the apposition of the graft takes place, any coagulated blood or serum being removed previously by gauze swabs.

(iv) The grafts touch each other or are in too close proximity. It is to avoid this contingency that the grafts are placed on opposite sides of the testis.

By a careful observance of the details as given, most, if not all, of the above causes of necrosis will be avoided.

(*c*) Liquefaction and Absorption may follow an attempt to implant grafts which are too small, or are too thin. When inadequate in these respects, the expected stimulus may be indefinite or wanting through insufficiency of the material introduced, even though absorption does not take place. In such cases the operation should be repeated.

APPENDIX II.

REPORT ON WOOL SAMPLES.

By J. A. Fraser Roberts, M.A., B.Sc.

The following wool samples were submitted for examination:—

Controls	.. ..	11 samples.
Grafted rams	.. ..	3 samples.
Daughters of grafted rams		3 samples.

The wool, taken as a whole, is fine, but variable, and approaches the coarser grades of Merino. It is, however, of rather different character from ordinary Merino wool. Some of the samples are distinctly poor as regards strength, and there is kemp in some of them. There is considerable variation also in length.

With regard to the effect of the grafts on the rams and on the progeny of those rams it is impossible to come to any conclusion as the control samples cover the entire range of variation. The best sample is a control. There may be a difference in total fleece weight, but this, of course, cannot be determined from samples. It may be doubted whether clear evidence on the question of the effect of the graft on wool quality is to be obtained from such variable material as this unless very large numbers are used.

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April 4, 1929

To the American Consul,

Algiers, Algeria.

The Secretary of State encloses a copy of a communication dated March 27, 1929, from the Acting Secretary of Agriculture, stating that the Bureau of Biological Survey, Department of Agriculture, is desirous of receiving reports containing information pertaining to Karakul sheep raising in Southwest Africa, together with other pertinent information regarding this industry in Africa.

The Consul is instructed to furnish, at his earliest opportunity, such information on this subject as may be available for transmission to the Department of Agriculture.

Enclosure:

From Department of
Agriculture,
March 27, 1929.

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FA HLS:GMH SS

H.L.S. 1000

CK W.J.
APR 3, 1929

A true copy of the signed original.

GMH.

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